It enables us to understand why in a well-fed body it may be some time after nitrogen is cut off before the muscles have any difficulty in obtaining what they want, and why in a body ill-supplied with nitrogen exertion lessens, or if kept up produces bad effects.

If exertion is persevered in under such circumstances, a failure somewhere is always observed. Frequently the nervous system or the heart shows signs of weakness, a result which could hardly be explained by the view of the Swiss Professors. It is certainly an argument for the view I have advocated, that it is in harmony with the teachings of experience, and restores to the rules of diet their old significance.

X. "Note on the Lunar-diurnal Variation of Magnetic Declination." By J. A. Broun, F.R.S. Received May 11, 1867.

Lausanne, 7th May, 1867.

I received late last night No. 91 of the Proceedings of the Royal Society, and desire to offer the following remarks on the abstract of a paper by Mr. Neumayer which I find therein (vol. xv. p. 414).

Mr. Neumayer is evidently unacquainted with the Note by me, read to the Royal Society of London in 1861 (Proc. Roy. Soc. vol. x. p. 475), in which I stated as result of the discussions of five years' observations at Trevandrum (near the magnetic equator) that the lunar-diurnal variation of magnetic declination became inverted, like the solar-diurnal variation, when the sun passed from one hemisphere to the other, both the solar- and lunar-diurnal variations depending on the position of the sun.

I also stated the laws of the lunar-diurnal variation, not only for the moon north and south, as Mr. Neumayer has done, but also for the moon on the equator moving northwards, and again on the equator moving southwards, the laws being different for the moon in the same position according as she was moving in one direction or in the other.

I pointed out in the Transactions of the Royal Society of Edinburgh (vol. xviii. p. 354), that the reversal of movement of the declination-needle with the sun north and south of the equator, observed within the tropics, had its equivalent in the different ranges of the solar-diurnal variation for summer and winter in high latitudes. It followed in like manner that, the lunar-diurnal variation being inverted with the solar-diurnal variation near the equator, a similar difference of ranges should be observed in the laws of lunar-diurnal variation for summer and winter in the higher latitudes. Of this fact I satisfied myself by a rediscussion of the Makerstoun observations, after rejecting the large disturbances.

Another consequence of the law of inversion of the lunar-diurnal variation near the equator with the sun's passage from one hemisphere to another, and with the inversion of the solar-diurnal variation, was the opposition or approximate opposition of the mean curves

The Royal Society is collaborating with JSTOR to digitize, preserve, and extend access to *Proceedings of the Royal Society of London.* www.jstor.org

of lunar-diurnal variation in the higher latitudes of the two hemispheres. This conclusion, however evident at the time my note was written (1861), appeared opposed to the fact, since the law of lunar-diurnal variation at Toronto, according to General Sabine's discussion, was an inversal of that at Prague and Makerstoun, all three places in the same hemisphere; this I pointed out at the time (Proc. Roy. Soc. vol. x. p. 475). This statement seems to have caused a re-examination of the Toronto discussion, as General Sabine afterwards discovered that west had been substituted for east in his original memoir.

It followed from the similarity of the laws for the sun and moon discovered by me, and, *this correction made*, from the observations in the two hemispheres, that the mean law for a north latitude should be the inverse of that for a south latitude; or that a maximum of easterly declination in one hemisphere should be simultaneous, or nearly so, with a minimum in the other.

My chief object now is to draw attention to the fact (published in 1861) of the similarity of the changes of the laws of solar- and lunar-diurnal variations of the magnetic needle, with the sun's change of declination, as this fact appears to have escaped the notice of those men of science who since then have been engaged in proving independently the conclusions which follow from the note now referred to.

Mr. Neumayer remarks "that in some cases the lunar-diurnal variation manifests itself in a very striking manner during the winter months." This fact I had already remarked in the discussion of the Makerstoun observations for 1844 and 1845; but I have shown in a paper forwarded lately to the Royal Society of Edinburgh that the effect of the lunar action is sometimes *greater* than that of the solar action; and this is made evident from the lunar-diurnal variations for *single* days, as well as in the means deduced from a single lunation (Dec. 1858 to Jan. 1859) for each of the four positions of the moon already referred to.

XI. "An Account of Observations on the great Nebula in Orion, made at Birr Castle, with the 3-feet and 6-feet Telescopes, between 1848 and 1867." By Lord Oxmantown. Communicated by the Earl of Rosse, K.P., &c. Received June 17.

(Abstract.)

In this paper an account is given of the observations which have been made with the 3-feet and 6-feet telescopes on the great Nebula in Orion during the last eighteen years. The observations are accompanied by an elaborate drawing.

In the year 1852, Mr. Bindon Stoney made a drawing of the Huy-